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STEIN, MCEWEN & BUI, LLP
1400 EYE STREET, NW
SUITE 300
WASHINGTON, DC 20005

EXAMINER

DOVE, TRACY MAE

ART UNIT PAPER NUMBER

1745

DATE MAILED: 09/28/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Art Unit: 1745

DETAILED ACTION

This Office Action is in response to the communication filed on 7/14/06. Applicant's arguments have been considered, but are not persuasive. Claims 1, 4, 7-16, 19, 20, 23, 26, 32, 33 and 36-41 are pending. This Action is made FINAL.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1, 4, 7-16, 19, 20, 23, 26, 32, 33 and 36-41 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claims 1 and 19 recite "a volume ratio of the weak polar solvent to the strong polar solvent to the lithium protection solvent is 3:1:1", which is not supported by the specification as filed. Claim 12 and 33 recite "a volume ratio of the weak polar solvent to the strong polar solvent to the lithium protection solvent is 2:2:1", which is not supported by the specification as filed. Claim 38 recites "a volume ratio of a weak polar solvent to a first strong polar solvent to a second strong polar to a lithium protection solvent is 20:16:4:10", which is not supported by the specification as filed. Claim 39 recites "a volume ratio of a first weak polar solvent to a second weak polar solvent to a strong polar solvent to a lithium protection solvent is 16:4:20:10", which is not supported by the specification as filed. Claim 40 recites "a volume ratio of a weak polar solvent to a first lithium protection solvent to a

Art Unit: 1745

strong polar solvent to a lithium protection solvent is 4:1:4:1”, which is not supported by the specification as filed. Claim 41 recites “a volume ratio of a first weak polar solvent to a second weak polar solvent to a strong polar solvent to a lithium protection solvent is 2:2:5:5”, which is not supported by the specification as filed. The volume ratio disclosed in Table 1 provide support only for the specific solvent combinations described in Examples 1-7. The specific volume ratios disclosed by Table 1 cannot be broadened to describe general solvent groups. For example, Example 1 teaches a volume ratio of dimethoxyethane to sulfolane to 1,3-dioxolane of 3:1:1. Thus the specification only supports a volume ratio of 3:1:1 when dimethoxyethane/sulfolane/1,3-dioxolane are the solvents.

Claims 1, 4, 7-11, 19, 20, 23, 26, 32 and 36 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for a volume ratio of dimethoxyethane to sulfolane to 1,3-dioxolane of 3:1:1, does not reasonably provide enablement for a volume ratio of a weak polar solvent to a strong polar solvent to a lithium protection solvent of 3:1:1. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make or use the invention commensurate in scope with these claims. Specific volume ratios used for a specific solvent combination in the examples may not be broadened to encompass solvent combinations not described by the specific examples.

Claims 12-16, 33 and 37 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for a volume ratio of dimethoxyethane to sulfolane to 1,3-dioxolane of 2:2:1, does not reasonably provide enablement for a volume ratio of a weak polar solvent to a strong polar solvent to a lithium protection solvent of 2:2:1. The specification does

Art Unit: 1745

not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make or use the invention commensurate in scope with these claims. Specific volume ratios used for a specific solvent combination in the examples may not be broadened to encompass solvent combinations not described by the specific examples.

Claim 38 is rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for a volume ratio of dimethoxyethane to sulfolane to dimethylsulfoxide to 1,3-dioxolane of 20:16:4:10, does not reasonably provide enablement for a volume ratio of a weak polar solvent to a first strong polar solvent to a second strong polar solvent to a lithium protection solvent of 20:16:4:10. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make or use the invention commensurate in scope with these claims. Specific volume ratios used for a specific solvent combination in the examples may not be broadened to encompass solvent combinations not described by the specific examples.

Claim 39 is rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for a volume ratio of dimethoxyethane to 2-methyltetrahydrofuran to sulfolane to 1,3-dioxolane of 16:4:20:10, does not reasonably provide enablement for a volume ratio of a first weak polar solvent to a second weak polar solvent to a strong polar solvent to a lithium protection solvent of 16:4:20:10. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make or use the invention commensurate in scope with these claims. Specific volume ratios used for a specific solvent combination in the examples may not be broadened to encompass solvent combinations not described by the specific examples.

Art Unit: 1745

Claim 40 is rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for a volume ratio of dimethoxyethane to 3,5-dimethylisoxazole to sulfolane to 1,3-dioxolane of 4:1:4:1, does not reasonably provide enablement for a volume ratio of a weak polar solvent to a first lithium protection solvent to a strong polar solvent to a lithium protection solvent of 4:1:4:1. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make or use the invention commensurate in scope with these claims. Specific volume ratios used for a specific solvent combination in the examples may not be broadened to encompass solvent combinations not described by the specific examples.

Claim 41 is rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for a volume ratio of dimethoxyethane to diglyme to sulfolane to 1,3-dioxolane of 2:2:1:5, does not reasonably provide enablement for a volume ratio of a first weak polar solvent to a second weak polar solvent to a strong polar solvent to a lithium protection solvent of 2:2:5:5. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make or use the invention commensurate in scope with these claims. Specific volume ratios used for a specific solvent combination in the examples may not be broadened to encompass solvent combinations not described by the specific examples.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

Art Unit: 1745

having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 4, 7-16, 19, 20, 23, 26, 32, 33 and 36-41 are rejected under 35 U.S.C. 103(a) as being unpatentable over, Evans et al., US 4,302,520.

Evans teaches an electrochemical cell comprising a solid cathode material, a lithium anode and an organic electrolyte. The solid cathode material includes metallic bismuth, metallic sulfur and metallic iron or lead. The electrolyte includes a mixed solvent and a solute (abstract). The cathode may include a conductive agent (2:20-21). The anode may comprise lithium or a lithium alloy (2:46-55). Preferred solvents for the electrolyte include sulfolane (strong polar), acetonitrile (strong polar), tetrahydrofuran (lithium protect), methyl tetrahydrofuran (weak polar), dioxolane (lithium protect), 3-methyl-2-oxazolidone (strong polar), propylene carbonate (strong polar), butyrolatone (strong polar), ethylene glycol sulfite (strong polar), dimethylsulfite (strong polar), dimethyl sulfoxide and dimethoxyethane (weak polar) (4:28-39). The best electrolyte solvent is a 3-methyl-2-oxazolidone (3M2O) based electrolyte. Low viscosity solvents may be used as cosolvents with the 3M2O solvent. The low viscosity solvents are listed at col. 4, lines 62-col. 5, lines 4. The total amount of the low viscosity cosolvent added could be between about 20% and about 80% based on total solvent volume (5:4-9). Example 1 teaches an electrolyte comprising a mixed solvent and a LiCF_3SO_3 salt. The mixed solvent comprises dioxolane (lithium protect), dimethoxyethane (weak polar), 3M2O (strong polar) and dimethylisoxazole (lithium protect). Furthermore, Evans teaches at least seven of the members of the strong polar solvent Markush group as recited by the claimed invention. Also disclosed by Evans are at least two members of the weak polar solvent Markush group and at least two

Art Unit: 1745

members of the lithium protection solvent Markush group as recited by the claimed invention.

The electrolyte is a mixed solvent.

Evans does not teach a specific example of the claimed mixed organic solvents.

However, Applicant's own disclosure teaches that 3-methyl-2-oxazolidone may be used as the strong solvent. The claims have been amended to delete "3-methyl-2-oxazolidone" (3M2O) merely to try to overcome the prior art of record. No support is found in the specification for the deletion of 3M2O. Applicant's invention does not disclose any rationale for the deletion of 3M2O or why 3M2O could not function as the strong polar solvent. Furthermore, the courts have ruled that by the presentation of a Markush group for the strong polar solvents, Applicant has made the representation that for the purpose of the present invention, the elements of the group are equivalents. Having made this representation, Applicant may not now argue that these two elements are not equivalents. In re Skoll, 187 USPQ 481 (CCPA 1975). Thus, the invention would have been obvious to one of skill because 3M2O is considered equivalent to the strong polar solvents recited by the claimed invention.

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Claims 1, 4, 7-16, 19, 20, 23, 26, 32, 33 and 36-41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vourlis, US 5,432,030.

Vourlis teaches a lithium/FeS₂ rechargeable electrochemical cell comprising an electrolyte including a solvent mixture of 3-methyl-2-oxazolidone (strong polar), 1,3-dioxolane (lithium protect) and 1,2-dimethoxyethane (weak polar) with a LiCF₃SO₃ salt. See abstract. FeS₂ is a sulfur based compound comprising an iron additive. The anode may contain lithium or a lithium alloy (3:42-45). The cathode may contain a conductive material and a binder (Ex. 1).

Art Unit: 1745

The cathode material is coated on a current collector (Ex. 4). The cathode may contain In_2S_3 , Pb_3O_4 or TiS_2 (1:47-50). Sample D in Table 1 teaches a volume ratio of 3:1:1 of dimethoxyethane to 3M2O to 1,3-dioxolane (weak polar to strong polar to lithium protection). Example 2 in Table 2 teaches an electrolyte with 23.3% 1,3-dioxolane/46.7% dimethoxyethane/30% 3M2O. See claim 1.

Vourlis does not explicitly teach the strong polar solvent, as currently claimed.

However, the invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made because Applicant's own disclosure teaches that 3-methyl-2-oxazolidone may be used as the strong solvent. The claims have been amended to delete "3-methyl-2-oxazolidone" (3M2O) merely to overcome the prior art of record. No support is found in the specification for the deletion of 3M2O. Applicant's invention does not disclose any rationale for the deletion of 3M2O or why 3M2O could not function as the strong polar solvent. Furthermore, the courts have ruled that by the presentation of a Markush group for the strong polar solvents, Applicant has made the representation that for the purpose of the present invention, the elements of the group are equivalents. Having made this representation, Applicant may not now argue that these two elements are not equivalents. In re Skoll, 187 USPQ 481 (CCPA 1975). Thus, the invention would have been obvious to one of skill because 3M2O is considered equivalent to the strong polar solvents recited by the claimed invention.

Response to Arguments

Applicant's arguments filed 7/14/06 have been fully considered but they are not persuasive.

Applicant's arguments regarding Evans are moot in view of the new grounds of rejection.

Applicant argues Vourlis fails to teach or suggest a volume ratio of the weak polar solvent to the strong polar solvent to the lithium protection solvent is 3:1:1. However, Sample D in Table 1 teaches a volume ratio of 3:1:1 of dimethoxyethane to 3M2O to 1,3-dioxolane (weak polar to strong polar to lithium protection).

Note all volume ratio limitations of the claimed invention are rejected under 35 U.S.C. 112, 1st, as not being supported by the specification as filed. Examiner stated during the interview of 4/12/06 that the volume ratios of Table 1 only applied to the specific solvent combinations disclosed by Table 1. The Examiner suggested during the interview that a continuation-in-part application be filed if Applicant wishes to have claims drawn to solvent percentages for the general classes of compounds (weak polar, strong polar and/or lithium protection). Since Applicant was already advised the amendment filed 7/14/06 would introduce new matter into the claimed invention, no interview after final rejection will be granted.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

Art Unit: 1745

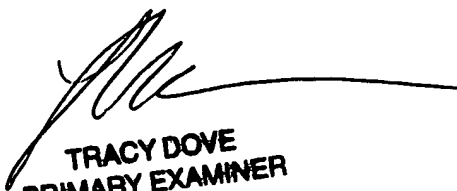
however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tracy Dove whose telephone number is 571-272-1285. The examiner can normally be reached on Monday-Thursday (9:00-7:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

September 24, 2006



TRACY DOVE
PRIMARY EXAMINER